

PERINATAL LESSONS FROM THE PAST

Dr Edith Potter (1901–1993) of Chicago: pioneer in perinatal pathology

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Following in the footsteps of Billard and Ballantyne, Edith Potter founded from the 1930s onwards the modern subspecialty of perinatal pathology. Her name is eponymously linked with the facial characteristics of infants with bilateral renal agenesis.

Edith Louise Potter, the only daughter of a locomotive engineer, was born in Clinton, Iowa, USA. However, the family moved first to Wisconsin and then to Minnesota where she received her schooling. Entering the University of Minneapolis, she qualified in medicine in 1925 (BS, 1923; MB, 1925). After an internship at the Minneapolis Hospital, she left for further studies in Vienna. On returning to Minnesota in 1927, she spent 5 years in private practice (MS, 1932) before seeking additional training in pathology under Dr E T Bell at the University of Minnesota. Thereafter, she accepted a pathology fellowship and obtained a doctorate of philosophy in 1934. The same year she moved to Chicago to work with Dr F L Adair, the chief of the newly opened Chicago Lying-in Hospital, first as instructor and later as professor in pathology.^{1–3}

In Chicago, Dr Herman Bundeson, the head of health department, had become convinced that the

health of a city was reflected in its infant death rate. To discover the cause of deaths of babies, he made it difficult if not impossible to obtain a perinatal burial permit until a necropsy had been undertaken. This enabled Edith Potter to gain tremendous experience in perinatal postmortem examination and to show that the two leading causes of death among term infants in the 1930s were intracranial haemorrhage and hypoxia associated with long and traumatic labours, findings that were published with Dr Adair in 1939.⁴

During the 33 years Dr Potter spent at the University of Chicago Medical School, she carried out >10 000 perinatal postmortem examinations, authored six books and published 140 scientific papers. Almost on her own, she created the new subspecialty of perinatal pathology.^{1–3} As she wrote:

Most pathologists are not interested in babies, largely because adult pathology is so much more spectacular. For too many years, the concern was the mother. A baby's death was considered an act of God about which not much could be done.

Dr Potter's second major publication was on Rhesus haemolytic disease, published in 1947.⁵ However, her most important contribution to the medical literature was undoubtedly a magnum opus, titled *Pathology of the fetus and newborn* (subsequently changed to "infant"), first published in 1953,⁶ with later editions in 1961, and then with John M Craig in 1975. In the forward to the first edition, she wrote:

For the past 18 years I have been intensely interested in the fetus as it develops in the uterus and in the infant as it adapts, after birth, to a new environment and a new type of existence. This interest has included the normal variations in growth and development, the physiologic adjustments necessitated by birth, and the behaviour of the newborn infant as well as the more extreme variations that are generally considered pathological ...

The description of the body of the dead infant is of no value as an isolated piece of information, but if it is integrated with the various aspects of heredity, conception, development, intrauterine and extrauterine environment and behaviour, it becomes part of an important chronicle ... In addition to the ultimate aim of the pathologist



Figure 1 Dr Edith Potter (1901–93).

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[to promote the well-being of the living], of immediate practical importance is the demonstration to the attending physician of the pathological changes found in any fetus or infant who fails to survive and the correlation of these findings with the symptoms observed during life. When symptoms can be recognised as associated with specific pathologic processes a great stride has been made toward their prevention and cure ... It is hoped that [this book] will be of practical value to the pediatrician and the obstetrician as well as the pathologist.

On Potter's facies and syndrome

In 1946, Edith Potter reported the necropsy findings of 20 infants dying in the perinatal period with bilateral renal agenesis.^{4,5} After discussing the occurrence of associated malformations and deformities such as clubfeet, she wrote:

Two anomalies were observed in almost all of these infants which to my knowledge have not previously been recognised as characteristically associated with renal agenesis. These are hypoplasia of the lungs and an abnormal facial expression.

In describing the facial characteristics of what is now known as Potter's facies, she observed:

The peculiar facies of these infants likewise seems to have no specific embryologic correlation with the renal anomaly. The face most characteristically exhibits an increased space between the eyes, a prominent fold which arises at the inner canthus and sweeps downward and laterally below the eyes, an unusual flattening of the nose, excessive retraction of the chin, and a moderate enlargement and decreased chondrification of the ears. The face gives a suggestion of premature senility and is sufficiently characteristic to warrant a diagnosis of co-existing renal aplasia when it is observed.⁷

As a result of her observations, Edith Potter noted that kidney function was clearly not necessary for the maintenance of intrauterine life. Among the infants with renal agenesis born alive, she observed that most were cyanotic or breathed with difficulty and that all died within an hour or two of birth, presumably because of the pulmonary hypoplasia. She was unable to explain the presence of this hypoplasia, pointing out that "There is no apparent relationship between the embryonic development of the lungs and the ureters and kidneys". With respect to hypoplasia of the bladder in association with bilateral renal agenesis, she wrote:

The persistence of the bladder as a slender tubelike structure with little musculature in its wall appears to be secondary to the absence of the stimulation for growth normally found in the necessity for a reservoir for kidney secretions.⁸

Although she recorded the probable association of oligohydramnios with bilateral renal agenesis, at first she did not seem to relate the characteristic facies and associated deformities with prenatal fetal compression. This was all the more

surprising, in that she observed that infants with extreme renal hypoplasia or massive polycystic kidneys often had similar facies. Only later did she and others^{9,10} appreciate that the multiple congenital deformities, including the features of Potter's facies and also pulmonary hypoplasia, were caused by the prolonged severe lack of amniotic fluid.

Gilbert-Barness² wrote: "Those who knew Dr. Potter personally recall with great fondness and admiration the strength of her character, her great human qualities, and her zest for knowledge. Her life can only be described as inspirational." She was also a tireless worker, remarking at the age of 87 years that, "I'm busier now than I have ever been—isn't life wonderful!" During the 1950s and 1960s, she travelled widely, lecturing and advising on perinatal pathology in many parts of the world. The profile of her life² lists the many honours Potter received:

... awards from the University of Minnesota, the New York Infirmary, the National Association for Retarded Children, the American Gynecological Society and the City of Hope. In 1983 she was inducted into the Hall of Fame of the American College of Obstetricians and Gynecologists in Washington DC. She received honorary degrees of the University of Brazil, the University of Pennsylvania, and the University of South Florida. She was also made an honorary member of the Society for Pediatric Pathology ... In 1988, in tribute to her years of dedicated service to medical education, the annual Edith Potter Lectureship was established at the University of South Florida at Fort Myers.

In 1943, Edith Potter married Alvin Meyer, an architectural sculptor, and after her retirement in 1967, they moved to Fort Myers in Florida, USA, where she earned the reputation of being a gourmet cook. She also pursued her interest in horticulture. She became an authority on tropical and subtropical plants and flowers, especially the bromeliads.¹ When her husband died in 1976, she married a family friend, Frank Deats, an architectural coordinator and water colourist, but was again widowed soon after in 1983. She developed cancer of the colon, and died while on a Caribbean cruise on 22 March 1993 at the age of 91 years. She recorded that she would like to be remembered "as having been responsible for establishing perinatal pathology as an important field of endeavour".³

Competing interests: None declared.

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